



Europäisches Patentamt
European Patent Office
Office européen des brevets



(11) Publication number:

0 406 757 A3

(12)

EUROPEAN PATENT APPLICATION

(21) Application number: **90112582.3**

(51) Int. Cl.⁵: **G01N 30/46**

(22) Date of filing: **02.07.90**

(30) Priority: **04.07.89 FI 893243**

(43) Date of publication of application:
09.01.91 Bulletin 91/02

(84) Designated Contracting States:
CH DE FR GB IT LI NL

(88) Date of deferred publication of the search report:
13.03.91 Bulletin 91/11

(71) Applicant: **VALTION TEKNILLINEN
TUTKIMUSKESKUS
Vuorimiehentie 5
SF-02150 Espoo(FI)**

(72) Inventor: **Himberg, Kimmo
Ulvilantie 11 B C 75
SF-00 350 Helsinki(FI)
Inventor: Sippola, Erkki
Siltakylänkuja 3 F 47
SF-00 740 Helsinki(FI)**

(74) Representative: **Lehn, Werner, Dipl.-Ing. et al
Hoffmann, Eitle & Partner Patentanwälte
Arabellastrasse 4
W-8000 München 81(DE)**

(54) Procedure and apparatus for chromatographic separation.

(57) The disclosure concerns a procedure and an apparatus for chromatographic separation. According to the invention, the separation between a stationary, preferably liquid phase in a column and a gaseous mobile phase passed through it is performed in two stages by taking the sample under analysis to a first column (1) for rough separation of the compounds contained in it and cutting off the rough fraction separated from the sample by said column into a second column (2) for a second separation stage. The essential feature of the invention is that one or more reference compounds, i.e. retention index standards, are introduced into the first column (1) simultaneously with the sample, said reference compounds being so chosen that the retention time of at least one of them is shorter than that of the fraction to be separated from the sample, that the separation taking place in the first column is monitored using a detector (14), and that after the detector has detected one or more of the reference compounds said fraction is cut off into the second column (2) at an instant determined on the basis of the retention times of the detected reference compounds or other retention parameters calculated from the retention times. The procedure enables the cutting-off to be

performed at the right moment regardless of the change in retention times caused by the soiling of the columns.

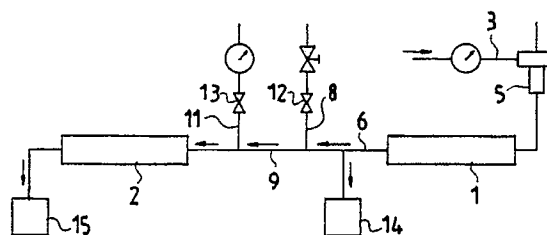


Fig. 2

EP 0 406 757 A3



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number

EP 90 11 2582

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
X	JOURNAL OF CHROMATOGRAPHY. vol. 363, no. 2, 29 August 1986, AMSTERDAM NL pages 199 - 205; F.R. GUENTHER ET AL: "Analysis of nitrogen heterocycles in shale oil by a dual capillary column heart cutting technique" * the whole document *	6-10	G01N30/46
A	* idem * ---	1-3	
A	GB-A-2024647 (TECHNICON INSTRUMENTS CORPORATION) * abstract; figure 1 * ---	1, 6, 8	
A	US-A-3717028 (R. ANNINO ET AL) * abstract * -----	1	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			G01N
The present search report has been drawn up for all claims			
Place of search BERLIN		Date of completion of the search 08 JANUARY 1991	Examiner JOHNSON, K
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application I : document cited for other reasons & : member of the same patent family, corresponding document			